

REMARKS

The drawings were objected to and claims 3, 7 and 11 were rejected under 35 U.S.C. 112, first paragraph. In response, Figs. 7-11 were replaced as set forth in the appended sheets.

In addition, claims 3,7 and 11 were amended as above. The structural requirements in the amended claims 3, 7 and 11 do not comprise an adjacent photo-electric conversion unit, and consequently, timing diagrams of the method of the present invention, along with a cross sectional view of the circuit perpendicular to the line I-I' shown in Fig.8 are unnecessary.

The structural requirements in the amended claims 3, 7 and 11 are supported in Fig. 8 and page 9 lines 3 to 16 of the specification of the present application.

Finally, Fig. 12 corresponding to the amended claims 3, 7 and 11 was added. The structure in Fig. 12 is supported in Figs. 2, 8 and page 9, lines 3 to 16, of the specification of the present application.

Claims 1-4 and 9-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,696,021 to Kawahara et al. in view of Applicant's admitted prior art. Claims 5-8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara et al. in view of Applicant's admitted prior art and in further view of U.S. Patent No. 5,903,021 to Lee et al..

Each of claims 1, 5 and 9 comprises the step of raising up the electric potential barrier and the step of beginning to read out the signal charges. The electric potential barrier is used for excluding surplus charges.

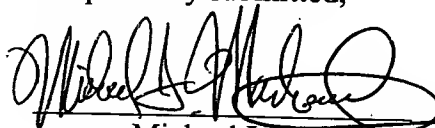
Kawahara discloses overflow control gate 4 and transfer gate 5 as shown in Figs 2A, 2B and 4A to 4G, and discloses that "the charges exceeding the potential barriers determined by the transfer gate applied voltage ϕ_{TG} , are transferred from the photodiodes 1 to the potential wells under the electrodes ϕ_1 and ϕ_2 as shown in FIG. 4C" (column 5, lines 38-41).

However, in Kawahara the potential barriers determined by the overflow control gate 4 (corresponding to the electric potential barrier of the present invention) is not raised up in Figs. 4A to 4D.

Lee does not disclose the step of raising up the electric potential barrier by a voltage applied to a substrate of the vertical OFD structure and the step of starting reading out the signal charges.

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Respectfully submitted,



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